Space Weather Forecast

Issued on Saturday, 16 April 2022 at 13:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-class flares likely. Increasing but still slight chance of Strong flares. Slight chance of G1/Minor geomagnetic storms on Days 1 to 3 (16-18 Apr).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate yesterday with a long duration Moderate-class flare observed between 15/1052-1427. This originated from just over the northeast limb, where there are one or more regions rotating onto the visible disc. This is likely associated with a region which gave several flares including an X-flare on the last rotation. There are three further sunspot regions on the visible disc, all of which are small and simple. No Earth-directed Coronal Mass Ejections (CMEs) have been observed.

Solar Wind / Geomagnetic Activity: The solar wind showed evidence of a fast wind connection to a coronal hole. Solar wind speeds were elevated to strong, varying between around 500 km/s to near 700 km/s. The interplanetary magnetic field (IMF) strength was weak to moderate. The north-south component initially varied moderately, but since 15/2000 UTC has been mainly northward directed. Geomagnetic activity has been Quiet to Active through this period.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is expected to be Low to Moderate. The new region(s) rotating onto the northeast limb appear active, with a recent Moderate-class flare and CME activity. The risk of Moderate-class flares is expected to increase as these regions rotate fully onto the visible disc, with a slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: No Earth directed CMEs are currently expected. Earth has connected with the fast wind from a coronal hole, with a further fast wind expected within the next 24 hours. However, it seems likely that these two features will run together, allowing elevated to strong solar wind speeds through much of Days 1-3 (16-18 Apr), before declining through Day 4 (19 Apr). This is also a positive polarity coronal hole which tends to give a muted geomagnetic response during spring.
Geomagnetic activity is forecast to be mostly Quiet to Active with just a slight chance of an isolated G1/Minor Storm interval during Days 1-3. Activity is expected to be largely Quiet by Day 4.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be at background levels, with just a slight increase in probability by the end of the period as the new region(s) rotating on move westwards to a position where radiation storm start to become more possible.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	60	70	70
Very Active	R3 to R5 X	No	5	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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